FAA AVIATION NEWS

JUNE 1967

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COVER

Alaska is a great adventure in light plane flying—but no place for the greenhorn pilot. See The Wide Blue Yonder, page 8.

FAA AVIATION NEWS

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GROOVED RUNWAYS

A New Approach to Safer Wet-Weather Landings

At Washington National Airport workers grooved 200 feet of runway a night on "graveyard" shift.

Hydroplaning is fun—provided you do it in a hydroplane on a suitable body of water. It is not fun if the vehicle is an airplane skidding out of control on a moisture-slick runway.

In a continuing effort to make runways safer under all weather conditions, the FAA has just completed scoring the entire 6,870-foot-length of Washington National Airport's north/south runway with grooves one inch apart. The grooves, ⅛th inch wide and ⅛th inch deep, are cut at right angles to the runway centerline. WNA will be the first airport in the United States to offer this safety feature.

Runway grooving was developed by the British, who are the acknowledged pioneers in "texturizing" runway surfaces. British experience dates back to 1956 following an increase in skidding accidents involving military planes. Among other experiments, the British tried grooving runways and the procedure worked so well that they soon expanded the program beyond military fields to civil aerodromes.

British success attracted world-wide attention and prompted a visit in 1965 by representatives of the FAA and the National Aeronautics and Space Administration. After a thorough-going two-week tour of English airfields and test and experimental installations, the Americans returned home with a headful of ideas, not the least important being that the British experienced no hydroplaning problems on problem runways after they were grooved.

After examining various groove widths, depths and spacing, the FAA/NASA research and development group settled on 18 different groove patterns. These will undergo laboratory and field tests to find the best one which will be used for testing by NASA at its Wallops Island, Va., test facility, using a variety of aircraft ranging from light planes to high performance jets.

The 18 test patterns have already been laid down on taxiways at five widely separated airfields—Miami, Cleveland, JFK, Salt Lake City and Los Angeles—to give preliminary data on how efficiently the grooves work under various climatic condition.

Putting Washington National "in the groove" carried a $93,825 price tag, or slightly more than $1 a line for the 81,440 grooves cut into the runway. The scoring was done at night, from midnight to 7 a.m., when traffic ceased and workers could proceed unhampered. Using seven special machines each equipped with 12 diamond studded circular saws, an average of 200 feet was covered during a typical work shift. Started on March 23 the job took 35 days. Work crews never exceeded 25 men, including supervisors.

In combating the phenomenon of hydroplaning, engineers recognized two major factors which create the problem. In one circumstance, a wave of water builds up under spinning tires and is overrun so that the aircraft is actually separated from the runway. Grooving allows this rush of water to be carried away by what amounts to thousands of tiny gutters.

Another cause of hydroplaning is the thin film of water which exists between tire and runway under wet conditions. Called viscous lubrication, this film measured only one or two thousandths of an inch thick but NASA tests have demonstrated that at least 7,000 pounds of pressure per square foot is sometimes needed to penetrate it. The grooves break up the glass-like slickness of the film in much the same fashion as the rough texture peaks sometimes do on concrete runways.

These tiny texture peaks, called asperities, penetrate the moisture film and provide a measure of traction. When a tire, pressed down by the weight of the airplane, makes contact with the runway, the entire weight of the plane rests first on the asperities. This produces enough pressure to break through the film.

The grooves will provide scientifically designed asperities which will give predictable traction under given conditions of moisture.

Other airports scheduled for grooving by municipalities in the immediate future are Kansas City and John F. Kennedy.

Diamond-tipped saws, spaced an inch apart.

Airplanes, like birds, tend to fly north with the summer sun. Today the great migration of general aviation pilots in search of adventure is to Alaska. The reasons are many: the appeal of the wide open spaces where you can really stretch your wings, the magnificent scenery—including the biggest mountains, glaciers and forests in the continent, the enormous wild game, the weird sunsets, the Eskimo villages . . . there is no end to the list of attractions. Best of all, you can see more of Alaska in a few weeks in an airplane than many a sweating sourdough saw in his entire lifetime.

You can also get into more kinds of trouble with an airplane in Alaska than you ever imagined possible, if you come unprepared. Every summer dozens of pilots fly up to Alaska with substandard equipment, which includes rusty flying skills as well as rusty engines, faulty radios, empty map cases, worn tires, etc. Some of these planes find a quiet grave in the wilderness. Their pilots, if lucky, return to the Lower Forty-Eight sadder but wiser men.

Statistics don't really begin to tell you how big or sparsely settled Alaska is. You have to see it from the cockpit of a small plane, in a fading sunset with no landmark in sight, to really appreciate what are you up against—a gigantic land mass of great plains broken only by ranges of saw-toothed mountains, lakes, curling streams and rivers. Towns are few and scattered and there is scarcely one mile of roadway for every 100 square miles of land.

The Alaskan bush pilots have, nevertheless, an excellent safety record, for they know the land and respect the conditions it imposes. They know the FAA facilities that are available and use them advantageously. They keep their aircraft in top condition, and they are practiced in the art of safe pilotage and air navigation, for they know there will be occasions when they will be outside the range of NAVAIDS. The outsider who is willing to follow their example will discover a new world of flying enjoyment and adventure in Alaska.

Getting to Alaska in your own plane is half the fun—and half of the problem. You can simply follow the coast line north from Seattle, but this route is not recommended, especially for the VFR pilot, with a single-engine, wheel-equipped aircraft. The weather is notoriously bad and airfields are few. By far the safest route is to follow the Alcan highway, from its southern terminus in the Dawson Creek—Fort St-John area up to Northway, Alaska (about 1,200 miles) and beyond to Fairbanks if you wish.

Flight plans over Canada are required and the Canadian Customs must be advised of your ETA at your first Canadian landing point; also American Customs at Northway. Basic survival equipment must be aboard.

Tower and station frequencies in Canada are similar to U. S. low frequencies and VHF. Three Canadian route charts covering the area from Winnipeg to Whitehorse are available at 50 cents each from the Map Distribution Office, Department of Mines and Technical Surveys, Ottawa, Canada.

The Alcan Highway extends some 1,500 miles into the heart of Alaska, is lightly traveled and generally usable anywhere as an emergency runway. Motels with landing strips are frequent in the Canadian section and easily spotted from the air. Other highways are few, but they do exist, so it is important to keep a finger on the chart and check the magnetic headings religiously, remembering that as you move up toward Alaska your true heading will be approximately *30 degrees greater* than your compass heading.

VOR airways in Alaska are also supplemented by LF four course ranges. WAC and Operational Navigation Charts (ONCs) are available from the U. S. Coast and Geodetic Survey. Sectional charts, previously non-existent for Alaska, are now being prepared and some will be available this summer and fall. The Alaska Airman's Guide and Chart Supplement is also issued by Coast and Geodetic (address Washington Science Center, Rockville, Md. 20852) for 50 cents a copy.

Once you leave the Alcan Highway you have only one concern: *don't get lost.* It really is a big country. There are two FAA Air Traffic Control Centers and 43 Flight Service Stations to help you find your way. Most of the stations have airstrips and are equipped for IFR approaches. There are literally hundreds of other airfields, almost within gliding distance of one another in some areas — if you have them spotted. Bodies of water suitable for seaplanes are even more abundant.

Early summer is the best flying season in Alaska, generaly speaking. However, low ceilings and poor visibilities may be anticipated in July and August along the coastal areas, and abrupt changes in weather *may occur at any time.* Winter in Alaska introduces such very serious weather problems as to be inconsistent with pleasure flying.

Minimum Summer Survival Equipment For Alaska and Canada

Axe	Mosquito head nets
Pocket compass	Rifle, ammunition (handguns prohibited, Canada)
Gill net, 4 trawls, 2 lines, hooks and sinkers	Food, 1,000 calories per person for 15 days
* Hunting knife	
* Snare wire, 30 feet	
Flares (15 min.)	
* First-aid kit	Strongly recommended: Dark cloth gloves, fire extinguisher.
Matches, waterproof container	

**Required in Alaska only.*

Huge wild game, like the moose, are seen from the air in their native habitat.

Seaplanes rimming the shores of Lake Hood. Cook Inlet is in the background.

For the seaplane pilot Alaska is liberally endowed with natural landing areas.

Most Alaska air routes take you over mountain passes, where the weather may be considerably poorer than at reporting stations along the route. Don't ever count on it being "open on top." Turn around, go back and wait; that is what the bush pilots do. And don't be tempted to find your own way over unmarked "passes" that turn out, after many wear miles, to be blind canyons with no fueling facilities.

Before you set your airplane down in an open area, make certain it will rise again before the snow flies. If the inviting "grassy plain" you choose for a picnic turns out to be tundra or muskeg, it may have the runway consistency of warm molasses, and it may be six months before your aircraft, refitted with skis, can take off again.

The Wide Blue Yonder

How to fly safely in Alaska

. . . the biggest mountains, glaciers and forests in the continent . . . you have to see it from the cockpit of a small plane.

Rivers are the pilot's friend in Alaska. They offer the kind of guidance provided by railroads during the "iron compass" days of flying. If you fly downstream or down river long enough, you will certainly come to a town, and most likely an airport.

If, in spite of all precautions, you do get lost or go down on unflyable terrain, you will be rescued fairly promptly if—if you have maintained radio contact at all times. It is important to radio your intentions *before* you carry them out, especially if this means going down. Your landing spot may be blocked out of radio range by mountain slopes, and if rescue operations have to guess where you are, it could be a long midsummer night.

If you do get stuck in the wilderness, it is generally best to stay with your airplane, build three signal fires, and wait. Rescue will come. Waiting is less exciting than trekking through the woods, but lost airplanes are found more quickly than lost people. It is a good precaution, incidentally, to *wear* your survival kit, in the event the plane burns.

Even a well-chosen landing field can leave you without a flyable airplane if you are careless. Incidents have been reported involving pilots who hand-propped an airplane that was not tied down, whereupon the plane took off and left them, alone, a hundred miles deep in the wilderness. The knowledge that you filed a flight plan, and did not deviate from it without reporting, can be very consoling under such circumstances.

Flying in Alaska is adventuresome, but responsibility for your own safety rests more heavily on the pilot here than elsewhere. What makes flying in Alaska a serious matter is that if you make a foolish mistake, you may be more concerned with survival than with a citation.

The principles of good airmanship which will safeguard the pilot in Alaska will also stand in good stead whenever you find yourself flying over wilderness areas or unfamiliar terrain beyond the reach of NAVAIDS. Confidence in the cockpit is the basis of flying enjoyment.

Lewis Gelfan

Giants of the Industry

second of a series

William T. Piper
flivver king of the air

When people say that aviation is a young man's game they must mean young in heart —or else they don't know about William T. Piper, who logged his 86th year in January and still faces each new day with the cheery enthusiasm of a man setting out to hunt bear with a switch.

Mr. Piper—he is not a man you call Bill —got into the airplane business almost by accident back in 1929, when he was 48 and a solidly established oil producer in Bradford, Pa. Until then he had taken only one ride in an airplane, an open cockpit OX-5 *Travel Air* biplane, and he was not impressed ". . . noisy and uncomfortable—something my children might be interested in."

But when Mr. Piper was invited to sit on the board of directors of the Taylor Brothers Aircraft Corporation, lately moved to Bradford to produce the two-place, 100-hp Taylor *Chummy*, his interest perked up. The $4,000 tag on the *Chummy* was a little steep, but times were booming.

The first *Chummy* had barely wobbled into the air when the stock market crashed and sales dropped to zero. But by this time the aviation bug had nipped Mr. Piper and he came down with a raging case of *airplaneitis*, an affliction he cheerfully bears to this day.

Pumping his own money into the firm, he moved into an active role. Taylor Aircraft decided to cut production costs by taking out the engine and offering the public what was left—a glider.

Sales were dull, but an exciting idea was born: what about a really lightweight low-cost airplane? The glider had unwittingly served as a prototype of the famous Taylor and Piper *Cubs*.

The *Cub* line evolved its name from its association with its first engine, a tiny two-cylinder, two-cycle, 20-hp Brownback *Tiger Kitten*. The maiden flight disclosed a ceiling of five feet above the ground. Back to the drawing board.

On June 15, 1931, the E-2 *Cub*, a frail, drafty and uncomfortable but trim little yellow two-seater was launched. With a stout 37-hp engine spinning a slender wooden propeller, the E-2 rolled a few short yards, lifted its tail and soared into the air. Cruising at 85 m.p.h. with a 7 to 8 thousand foot ceiling, the young *Cub* floated in for creampuff landings at 28 m.p.h. The price tag was a thrifty $1,325—less than the cost of a good car. America's kindergarten of the air was in the making.

In one sense, hard times helped the *Cub*. As Mr. Piper recalls, "Everyone who was still flying was starved into using *Cubs*." Things looked a little better by 1936—sales were up to about 500 that year. By that time the *Cub* had a closed cabin and was designated the J-2.

That same year C. G. Taylor moved to Ohio to build Taylorcraft and Mr. Piper bought the Bradford plant, now valued at about $700,000. Twelve months later the entire factory was destroyed by fire; there was only token insurance, because of the inflammable nature of aircraft material. Mr. Piper reacted with characteristic calm: "At least we'll get some publicity out of it."

He found an abandoned silk mill at Lock Haven, Pa., and within three months was back into production. He was 56 at the time, beset by losses and sales problems that would have floored a lesser man. Without hesitating, he committed all of his funds and energy into the Piper Aircraft Corporation. Despite the fire and the move, *Cub* production that year was a record-breaking 687.

In 1938 the first mass-produced airplane, the famed J-3 *Cub* came off the assembly line at Lock Haven. Quickly dubbed the "flivver of the air," it earned for Mr. Piper the sobriquet "the Henry Ford of aviation." More *Cubs* have been produced than any other single airplane model—more than 31,000 as of today.

Easy to fly, maneuverable, capable of landing or taking off in almost any open space, the *Cub* brought flying out of the esoteric blue and down to earth within reach of the average man. When World War II came along, at least three out of every four Army Air Corps pilots cut their flying teeth on a *Cub*. It was also widely used on the battlefronts for observation, liaison, ferrying personnel and as an aerial ambulance. Some 5,673 *Cubs* were delivered to the Armed Forces between Pearl Harbor and V-J Day.

General aviation manufacturers geared up to meet an expected post-war demand for light planes. Piper's 2,300 workers produced 8,000 *Cubs* and *Super Cruisers* while the rest of the lightplane industry was turning out an additional 20,000 aircraft in less than two years.

In late 1947 Mr. Piper introduced the *Vagabond*, a side-by-side two-seater. Two years later he bought out the four-place *Clipper*, fore-runner of the *Pacer* which, with the addition of tricycle landing gear in 1951 evolved into the celebrated *Tri-Pacer*, the first popularly priced aircraft of its kind, with simplified controls and handling. Once more he had a winner. More than 7,000 *Tri-Pacers* were sold.

The first twin-engine Piper, the *Apache*, flew in 1954. Mr. Piper rose to the occasion by qualifying for his twin-engine rating—at the age of 73.

In the fiscal year that ended in September, 1966, Piper sales amounted to more than $81 million. Total aircraft production recently passed the 70,000 mark—a record for civilian aircraft makers.

Not bad for an ex-oilman who really didn't care much for airplanes at first. But he was right about one thing—aviation was something his children would be interested in. His three sons—Thomas F., Howard, and William T. Jr.—are all vice presidents of Piper Aircraft Corporation.

The 1929 CHUMMY, 100 hp predecessor of the CUB, sold for $4,000, found few buyers.

The Piper J-3 CUB trainer, a familiar sight to World War II pilots at home and abroad.

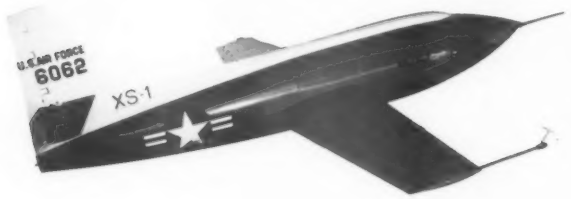
Faster than the SPEED OF SOUND

On the ground, "Glamorous Glennis" is anything but. Short, fat and painted bright orange, she is the ugly duckling of Muroc Dry Lake.

But in the air—ah, that's a different story. She is a thing of beauty in the desert sky, a swift and graceful flyer, a harbinger of things to come in aviation.

Glamorous Glennis is an airplane—and yet not so much an airplane really as she is a flying research laboratory, designed specifically to probe the mysteries of transonic flight and, if possible, to carry man across the so-called sound barrier and into the world beyond.

These are ambitious and daring goals in the year 1947, when men still talk about the sound barrier as if it is some sort of physical obstruction in the sky—and not without good reason. Severe buffeting and other strange phenomena are reported by pilots who approach the speed of sound in power dives. And more than one pilot loses his life as a result.



To meet this challenge, the Bell Aircraft Corporation of Buffalo, N. Y., designs an airplane shaped like a .50 caliber bullet—just 31 feet in length with a wing span of only 28 feet. Inside its stubby fuselage are four rocket engines, each of which delivers 1,500 pounds of thrust.

Officially, the airplane is designated as the XS-1 (Experimental Supersonic No. 1), but the "S" is dropped in popular use, and the aircraft is called simply the X-1. The name "Glamorous Glennis" is added later by Captain Charles E. "Chuck" Yeager, the man who flies the X-1 on its record breaking flights. The original Glamorous Glennis is Mrs. Yeager.

A double ace in World War II, Yeager is selected as project pilot for the X-1 in June 1947. Although only 24 years old at the time, he is regarded as one of the most skilled pilots in the Air Force.

Yeager first flies the X-1 in early Aug. 1947 from Muroc (now Edwards) Air Force Base, Calif. The test plane is carried aloft slung beneath the bomb bay of a specially modified B-29 and cut loose at about 25,000 feet. Yeager flies the ship without power on this and two subsequent flights—to familiarize himself with its handling characteristics—and then glides in for landing.

The B-29 also is used for the powered flights since a ground take off in the X-1 would have used most of the available propellant—288 gallons of liquid oxygen and 300 gallons of alcohol. This is only enough propellant for a 2½ minutes flight at full power—that is, with all four engines firing simultaneously.

On none of these flights with the B-29 does the pilot ride in the X-1 on takeoff, since the test plane might have to be jettisoned in the event of an emergency. Only when the B-29 is safely in the air does Yeager enter the X-1—climbing down a steel ladder through the slipstream into the open cockpit door.

The first powered flight is made on Aug. 29, 1947, and according to Yeager it goes like this:

". . . we climbed away as normally as you do prior to the drop. They drop you out and you turn on one chamber [engine] and you get a kick in the rear and since your thrust is instantaneous there is no build-up. I tried out all four chambers by turning one chamber on and letting it run a few seconds and turning it off. Then I turned on three chambers, climbed up to 40,000 feet, accelerated up to 0.87 Mach number, 87 per cent of the speed of sound; shut everything off, jettisoned the remainder of the liquid oxygen and fuel, glided down and landed and crossed myself a couple of times."

X-1 being carried to launch altitude of 25,000 feet by the B-29.

From this starting point, Yeager begins a gradual assault on Mach 1—the speed of sound. Each flight is programmed slightly faster than the last one. Mach 0.9 is reached and surpassed with no major problems although the X-1 does encounter light to heavy buffeting and experiences some control problems.

On the morning of Oct. 14, 1947, Yeager with more than half a dozen powered flights behind him is ready for a try at Mach 1. The X-1 is carried aloft by the B-29 and dropped out at about 20,000 feet. Yeager cuts in the four rocket engines one by one and the X-1 leaps away and begins climbing at a 45 degree angle. The sky deepens to purple and stars come out but the sun still glows. Yeager levels off and watches the needle of the Mach meter move past .90 to .92 to .94 to .96. Then at .98, the needle fluctuates, passes Mach 1—and goes off the scale.

It takes seven minutes to glide down with Yeager rolling and doing wingovers "for the fun of it" at a glide speed of 300 to 400 miles per hour.

". . . I saw a heavily-timbered mountain and thought it looked good for hunting, thought maybe it had a hidden lake where the fishing would be good. That's where I want to end up. Hunting and fishing. Lake Tahoe area. I'll give myself four or five more years of this kind of flying then I'll drive an old truck like the C-47, and when the 20/13 vision goes, I'll get a desk job."

This is what a man thinks about when he has just destroyed the myth of the sound barrier and opened the door to a whole new era in air transportation.

John Leyden

Colonel Yeager is now commander of the 405th Fighter Wing, Clark Air Base, Philippine Islands. The X-1 is in the Smithsonian Institution, Washington, D. C.

Busy Skies and Jet-Age Speeds Call for Greater Care in the Air Over Major Terminal Areas. . . .

safety and the single pilot

The single pilot has a lot of busy sky to watch . . .

In these days of rapidly increasing aircraft in the sky, moving at ever higher speeds, the general aviation pilot who flies alone in busy terminal areas should take advantage of the many services offered to him by FAA's air traffic system. Although the "see and be seen" practice is the time-honored method of maintaining aircraft separation in VFR weather, a pilot would do well to get all the help he can from the men and the radar scopes on the ground.

Today's pilot has much more traffic to look out for, and far more difficulty in seeing it clearly with the naked eye, than he had a few short years ago. For one thing, terminal area activity is multiplying at an incredible rate. FAA control towers reported 45 million take-offs and landings at controlled airports in 1966—a 19 per cent increase over 1965. Leading airports frequently handled over 2,000 operations a day, some averaging two operations a minute during peak hours.

At the same time, the switch to jets in the air carrier fleet is virtually doubling the airspeed of carriers. The general aviation jet fleet is also building up rapidly, with well over 1,000 business jets now. The steep climbout angle of jets on take-off, the wider turning radius and the more streamlined profile create new problems in visibility. The rather common presence of smog or haze over major terminals adds to the burden of the single pilot when he is relying only on his own eyes for safe separation.

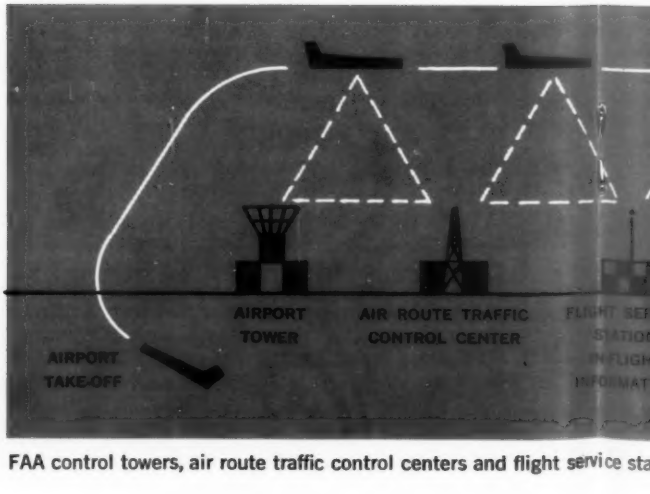
21 Air Route Traffic Control Centers separate IFR traffic.

The pilot who is flying IFR, regardless of the weather, has a distinct edge. He will have positive separation from other IFR traffic, and he will be advised of VFR traffic seen on the radar scope, controller workload permitting. The non-instrument rated pilot can add to his margin of safety by using a radar beacon transponder, set at the VFR code (0600). This will cause his aircraft to bloom as a clear target on a radar scope and establish the fact that he is flying VFR below FL 240.

Many pilots who have never watched radar scopes have the naive idea that anything that moves in the sky shows up distinctly on the scope. The truth is that small aircraft may be quite indistinct, especially if at low altitudes, or if the scope is cluttered with weather or other atmospheric disturbances. However, by merely flicking a switch, a controller can immediately enlarge the blips of all VFR traffic in his area with working transponders. The price range of transponders today begins at about $1,000.

If instrument ratings and transponders are out of the question, what then? Is the VFR pilot who flies alone in a busy terminal area asking for trouble?

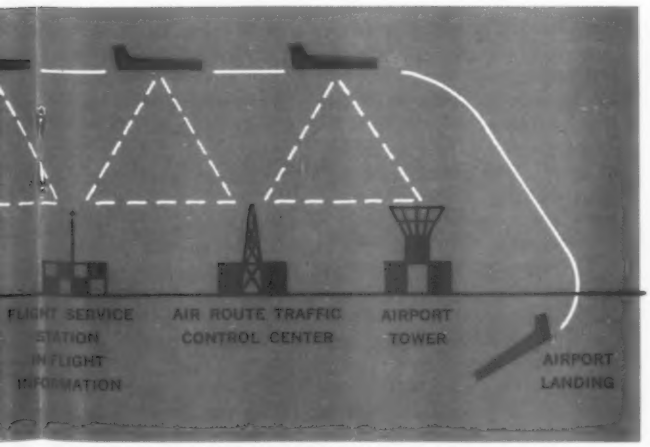
The answer is No, not at all, *if—if he is sharp on flight regulations and procedures, if he knows and uses preferential routes and takes full advantage of all the VFR flight advisory services offered by FAA towers, centers, rapcons, and Flight Service Stations.* The burden rests heavily on the VFR pilot to know and use these services, because they will not be offered to him automatically. FAA's radar surveillance is a marvelously intri-



FAA control towers, air route traffic control centers and flight service sta

FAA air traffic specialists lend him their eyes.

Airport Surveillance Radar "sees" you up to 40 miles.



t service stations provide pilots with flight data from take-off to landing.

cate system, but it does not necessarily note every sparrow that leaves its nest.

Consider the pilot who flies alone in a light twin, for example, from Westchester Airport in New York to Montgomery County Airport, near Washington, D. C. He will be flying through one of the busiest air corridors in the world. He will be in the vicinity of half a dozen major airport hubs: La Guardia, Kennedy, Newark, Philadelphia, Friendship (Baltimore) and Washington National. Yet his flight can be pleasurable and safe, if he knows how to make it so.

Let's follow this pilot in our imagination. While still on the ground at Westchester, he files his VFR flight plan. This will not provide him with separation from other aircraft in the air, but it does help him organize his flight properly. He will check in Part 3 of the *Airman's Information Manual* for the airports that now offer expanded radar service and are located along his proposed route. This is a good time to note the radio frequencies assigned to this service, so that he will not waste flight time waiting on other over-burdened frequencies.

This is also the time to check the *Airman's Manual* for the preferred routes. Choosing a preferred route assures a pilot that he is moving *with* the traffic, rather than *against* it. In this case, Victor 3 is indicated, and readily accessible from Westchester.

Once airborne but before turning on Victor 3, our pilot can report his intentions to Kennedy expanded radar service and ask for traffic information. Although this service is primarily intended for arriving and departing aircraft, it will also be offered to aircraft in transit whenever the controller workload permits. If Kennedy tower is too busy to respond immediately or controller workload will not permit provision of the service, the pilot can call La Guardia approach control, or the flight service station at Teterboro and ask for traffic information in the area. Further along en route, he can call Newark approach control and be given traffic data.

In receiving traffic information from a radar equipped facility, the pilot must remember that the air traffic controller sees him only as a blip on his radar scope, moving in a given track over the ground. If the aircraft is crabbing, for example, 25-30 degrees into a westerly wind, in order to maintain a southerly heading, the controller may be quite unaware of this. Consequently, if traffic is reported at one o'clock the pilot will not find it by looking to his right. The traffic may be dead ahead, or even to the pilot's left as seen from his position in the cockpit. It is important to remember that the controller is not in the airplane.

Even in IFR conditions, with the ground and horizon obscured, the pilot can visualize, approximately, his crab angle by noting the difference between his heading and the magnetic heading of the airway he is flying, at any given point. In the example of our pilot from Westchester, if he observes that his compass heading is 230° while in the vicinity of Gaithersburg on Victor 3, where the heading on the chart is 202°, he knows that he is crabbing about 28° into the wind (to his right). Since he also knows that every "clock hour" of direction is equivalent to 30 compass degrees, he can expect traffic given at one o'clock to appear *directly ahead, not to his right.*

In all probability Friendship (Baltimore) terminal radar will be able to track the aircraft to within a mile of the runway at Gaithersburg (Montgomery County) airport. It not, Dulles International Airport approach control, 20 miles southwest of Gaithersburg, may offer radar assistance until the aircraft has the airfield in sight.

In this manner, a flight along a busy air corridor is completed with maximum safety. In addition to the pilot's own two eyes, many other eyes, both human and electronic, have acted as his observer. Even when the right-hand seat is occupied, the assistance of radar surveillance and ground observation provide an extra margin of safety at no cost. No pilot who flies alone can afford to be without it.

nothing can stop the new 'army air corps'

Part I of a series on FORT RUCKER the busiest flight training center in the U. S.

Like giant bees buzzing around an oversized beehive, swarms of helicopters buzz in and out of seemingly countless heliports and staging areas at Fort Rucker, near Dothan, Ala., site of the largest rotorcraft airman training center in the world.

Military activity in the air over Viet Nam involving helicopters and light aircraft is the responsibility of the United States Army, rather than the Air Force. To meet this responsibility, the Army's Aviation School and Center at Fort Rucker, sprawling over 61,000 acres of military reservation, is turning out about 26,000 qualified pilots and aircraft mechanics each year.

This means that Fort Rucker is now probably the busiest aviation center in the country. Last year, total operations at the post—landings and takeoffs from airports, heliports, along dirt roads, from sod strips etc.—totaled more than *three and a half million*. By comparison, Chicago's O'Hare International Airport—the busiest air carrier airport—had a total of a little more than 500,000 operations.

Because of the great utility services performed by helicopters in Viet Nam, emphasis is on rotorcraft training. Currently, the Army Aviation School is graduating an average of 275 chopper pilots a month. Very soon pilots will also be graduating from a sister school at nearby Fort Stewart-Hunter Army Airfield, at Savannah, Ga., scheduled to start in July of this year. Production at the two "pilot factories" will eventually be about 7500 pilots a year.

Pilot and mechanic training in the Army Aviation School is being offered to young men drawn from both military and civilian life. Civilians who can qualify for the aviator program can enlist for the program as warrant-officer candidates. Flying experience speeds up the learning process but is not a prerequisite for qualification.

Candidates for army aviation training must be between the ages of 18 and 30. The average age of one recent class was 20.3 years. Candidates must also meet certain physical requirements and they must have completed high school. Because the aviation program has become one of the most popular training programs the Army has ever offered, recruiting officers can now afford to be selective. They are taking their pick.

Pilot trainees are usually given an eight week pre-aviation course before going to Fort Wolters, Texas, for preliminary flight training. Sixteen weeks are spent at Fort Wolters in Hughes TH-55A trainers or Hiller *Ravens*. Many of the flight instructors are civilians, both at the primary school in Texas and at the advanced school at Fort Rucker.

The sixteen week course at Fort Rucker begins with air work in the TH-13 *Sioux*. At the same time, instrument training is carried on in simulators before moving on to instrument flying. Only instrument trained pilots are able to take on the *Iroquois*, the helicopter most widely known in Veit Nam and called by GIs simply the "Hughey."

The final four weeks of training at Fort Rucker is designed to turn out a pilot able to handle the "Hughey" under any and all kinds of weather and terrain conditions.

It is at this point that Fort Rucker's 2,000 military instructors take over from the civilians. The fledgling helicopter pilot is given specialized training that will equip him for his mission in Viet Nam—escape and evasion, airmobile operations, formation flying, aerial gunnery, low level navigation, and survival. The military instructors know their business. About 95 percent of them are veterans of the fighting in Viet Nam.

Heavy emphasis is also placed on low-level flying and navigation, on recovery from power failure at low altitudes, and on speed and accuracy of tactics involving rescue and delivery of men and materials. Pilots are thoroughly indoctrinated in the specific mechanics of every aircraft they fly, and are qualified to make emergency repairs.

Instructors at Fort Rucker estimate the 210 hours of flying time, plus the ground school and flight instruction provided candidates at the Army Aviation School, would cost a civilian at least $5,000. The training includes 20 hours in a synthetic helicopter trainer, which responds to control manipulation in the same manner as an actual aircraft.

On finishing the course, the pilots become warrant officers and are usually assigned directly to Viet Nam.

Government and aviation officials are keeping a keen eye on Fort Rucker trying to estimate its influence on civil aviation. It is certain that the end of hostilities in Viet Nam will mean there will be a large group of young men thoroughly trained in handling rotorcraft. There will also be a larger group of mechanics and technicians thoroughly experienced in helicopter overhaul and repair work. Helicopter manufacturers are optimistic that the next few years will see a tremendous increase in the civilian use of rotorcraft. As they see it, the day of the helicopter is dawning.

Lt. Brian Mullady "under the hood" during instrument training at Ft. Rucker.

Synthetic trainers shorten instrument instruction time.

'Copter student logs time, proving the Army still likes its records neat and tidy. Formation takeoff, flight and landing demands absolute mastery of the aircraft because of turbulence stirred up by the rotors of the closely packed craft. Before students take on Bell **Iroquois** like these they learn the fundamentals in Bell **Sioux**. 'Copter pilots get 210 hours of actual flight training, plus extensive ground school.

FIRST COMMERCIAL AIRLINE IN THE WORLD

The first air carrier, a two-place flying boat, charged $5 per passenger and up, according to weight.

About 3,000 persons were gathered on the Florida beach. Most had never seen an airplane before. Most were convinced, moreover, that the strange airboat in the water in front of them would not fly. Even if it did lift out of the water there was no possibility that it could stay in the air over the 22 miles of water that separated St. Petersburg and Tampa. Or so they thought. Most everybody, in fact, believed the whole scheme was a hoax. It had all happened too fast.

It had begun about a month previously when a stranger jumped down from a train one morning in St. Petersburg. By nightfall he had met with city officials, set up the St. Petersburg-Tampa Airboat Line, arranged for a daily subsidy from the city, and promised to have an airboat and pilot on hand ready to begin operations on New Years Day of 1914. The stranger's name was Tom Benoist, President of the Benoist Aircraft Company of St. Louis.

The subsequent first flight on January 1st, was accompanied by the usual color and ceremony. There were speeches and flags and barking dogs and kids scrambling to the front. The first ticket was sold at auction and after spirited bidding was knocked down to A. C. Phiel, former St. Petersburg Mayor, for $400. Mr. Phiel wrapped his raincoat around him, climbed into the open cockpit located in the forward boat section of the craft and waved to the crowd. The airboat taxied out into the harbor, turned around and then roared back across the water. Gradually, it lifted off and began to climb into the air. Soon it disappeared from sight. The first commercial airline flight began moving into history.

At the controls of the airboat was Benoist's chief pilot and flight instructor, who went by the imposing name of Anthony Habersack Jannus. Tony Jannus, as his friends called him, was a solid, heavy set, somewhat handsome young man who hailed from Washington, D.C. An aerial barnstormer and adventurer, he knew the business of flying and loved it.

The successful takeoff and flight had not completely convinced the crowd on the beach. They hung around expectantly and there was an air of anticipation that something further and more dramatic would happen. It was a matter of intense relief, therefore, when the phone rang just 27 minutes after the airboat had left the beach. Tampa was calling to say the craft was in sight. About a half an hour later, the airboat itself appeared on its return flight and then put safely down. The first scheduled airline operation was now in business.

The St. Petersburg-Tampa Airboat Company soon added another airboat—one that could carry up to four passengers, piloted by Tony's brother, Roger. The regular one-way fare was $5 except for "fat men over 200 pounds." That fare was negotiable. The subsidy arrangements with the city provided the company would receive $50 a day through January and $25 a day through February and March. The net profit received from ticket sales was—according to some accounts—deducted from these subsidy payments.

The Jannus brothers continued operations. They missed very few scheduled flights and had neither accidents nor injuries. By the end of March they had carried 1,200 passengers. It was time now to renew the subsidy contract. But money had become tight, and the subsidy stopped. The world's first airline ended operations as suddenly as it began them.

The next time the Jannus brothers appeared in the news was October of 1916. Tony Jannus, serving as a salesman-pilot for the Curtiss Company, was killed in a crash in Russia while demonstrating an airplane to representatives of the Czar. About a year and a half later, Roger Jannus was shot down while serving as a pilot with the American Expeditionary Force.

Neither had reached the age of 30.

—Richard Shea

Crowds line the waterfront at St. Petersburg, Fla., on New Year's Day, 1914 to witness the world's first commercial air flight—22 miles over water to Tampa.

Air Taxi Operating Rules to Undergo Study By FAA Experts

The booming air taxi business, which grew from 2,000 to 3,500 aircraft operators in the past 15 years, will undergo FAA review later this year to see what changes are needed in operating rules to match the larger and more complicated aircraft and the expanding service.

In an advance notice of proposed rulemaking, the FAA noted that air taxi operations are becoming similar to certificated air carriers in many respects. The underlying feeling is that more rigid safety standards are in order for certain air taxi operations.

The FAA wants to go into such subjects as the size of flight crews, crew qualification and training, company operating manuals, administrative records concerning such matters as weight and balance and flight dispatch releases, flight time limitations, proving flights for new type aircraft, and passenger emergency evacuation procedures including requirements for cabin attendants.

The agency wants to know if there is a need to develop more realistic safety regulations for the growing number of air taxi operators who operate on regular schedules, including those with interline arrangements for transporting passengers to scheduled airline flights.

Also to be considered are rules which would require operators who have special authorization from the Civil Aeronautics Board to operate large aircraft to comply, as appropriate, with FAA rules governing the certificated supplemental carriers and commercial operators of large aircraft.

The proposed changes in the rules were prompted by the rapid progress of technology that has taken place since the CAB created the term "air taxi" and defined regulations governing them in 1952. Then, of the 2,000 small irregular air carrier operators, only 177 had a maximum certificated takeoff weight in excess of 6,000 pounds.

At the present time, while there are more than 3,500 air taxi operators, 116 of these who provide regularly scheduled service operate more than 150 aircraft in the over-6,000-pound category.

Moreover, the volume of air taxi operations with small aircraft can no longer be considered "jitney" operations. This activity is growing so rapidly and the growth can only be spurred by the recent or imminent introduction of "small" airplanes carrying as many as 20 persons.

With the increased availability of these aircraft, many air taxi operators will be capable of providing service of the kind that previously could have been provided only by an air carrier using large aircraft.

Comments on the advance notice ("Operation for Compensation or Hire with Small Aircraft," Docket No. 8041, Notice No. 67-9) should be submitted by June 30 to FAA Rules Docket, 800 Independence Ave., S. W. Washington, D. C. 20553.

In all but a few cases, the scheduled air taxi operators are located around air traffic hubs (the larger air carrier airports) and many are serving as extensions and feeder lines to the trunk and local service airlines. The smaller airports these scheduled air taxis cover radiate from hubs to the suburbs or communities up to several hundred miles distant.

Scheduled air taxis are also used to carry air freight, mail, and commuters, including children to and from school in tri-motor Ford planes.

The table shows the explosive growth of scheduled air taxi operations.

As of	SCHEDULED AIR TAXI AIRCRAFT					
	Total No. operators	Total	Single-engine 4 place & over	Multi-engine under 12,500 lbs.	Helicopter	Average No. of aircraft per operator
Jan. 1, 1964[1]	12	72	14	57	1	6.0
July 1, 1964[1]	15	83	17	65	1	5.5
Jan. 1, 1965[1]	52	258	70	182	6	5.0
July 1, 1965[1]	69	330	89	235	6	4.8
Nov. 15, 1965[1]	78	361	105	250	6	4.6
Nov. 1, 1966	116	510	150	353	7	4.3

[1] Alaska and Hawaii operators not included.

New Department of Transportation Chief Is Man On The Go

Boyd (left) and Don Piccard in basket of butane-fired balloon.

The SK-5 "Jet Skimmer" was a star attraction.

Daring young man awed the crowd with rocket leaps.

Boeing-Vertol 107 gave lucky passengers a bird's eye view.

No one can accuse Alan S. Boyd of not rising to the occasion when he marked the first official operating day of the new Department of Transportation, which now includes the Federal Aviation Administration. Described by one spectator as a "happening in motion," the occasion was a zany, memorable Pageant of Transportation staged by the Smithsonian Institution in honor of Boyd and his Department.

Gently swooping over the crowd of 50,000 in a hot-air balloon, lifting off in a gusty wake for a 15 minute helicopter ride, and skimming over the grassy concourse from the U.S. Capitol to the Washington Monument in a futuristic amphibious air cushion vehicle, Boyd gave the impression of a man literally and figuratively piloting his new craft to unprecedented heights.

If aviation drew the biggest applause for crowd pleasing, Boyd nevertheless showed no personal favoritism during the day. With equal good-natured enthusiasm he also rode in a horse-drawn 1880 omnibus, inspected prototype automobiles of the future, and examined models of high speed trains.

BRIEFS

• THE FEDERAL AVIATION ADMINISTRATION has awarded the official transport-category type certificate to the German HANSA JET, a new twin-engine jet airplane for business operation and commuter airline service. The HANSA JET was developed in Hamburg by Hamburger Flugzeugbau CmbH, a leading manufacturer of both civil and military aircraft. Its unique forward swept wing configuration is said to result in exceptional slow speed stability in addition to high speed cruise performance.

• WHO SAYS THE YOUTH OF AMERICA have a ho-hum attitude about flying? Of the 479,770 active pilots in the U. S., 71,689, or 15 per cent, are between the ages of 16 and 24. And that's not all. Among student pilots who are learning to fly, the under-25 age group accounts for an even larger--37 per cent--of the total. Teenagers alone make up 12 per cent of the nation's student pilots, even though they may not fly solo in a private plane before their 16th birthday.

• A SOLID STATE COMMUNICATIONS SYSTEM for use in low-activity terminal facilities has received favorable notice from the FAA following recent tests. It is a low power, 90-channel, solid-state portable transceiver. For details send $3.00 and request "VHF transceivers for Low Activity Air Traffic Control Towers," (AD 642717) from the Clearinghouse for Federal Scientific Information, Springfield, Va. 22151.

• INEXPENSIVE RED FILTERS, added to centerline runway lights, can provide valuable information to pilots taking off and landing by telling them how much runway remains. FAA engineers tested lighting patterns at the agency's National Aviation Facilities Experimental Center (NAFEC), N. J., involving red filters for the last 1,000 yards, and alternate red-white lights for the preceding 2,000 feet. Results are reported to be good in low visibility conditions.

• AT THE INTERNATIONAL EXPOSITION OF FLIGHT, in Las Vegas, April 27, FAA's Assistant Administrator for General Aviation Affairs, Robert V. Reynolds, said: "We must not lose sight of the fact that general aviation is an important member of our economy. The retail value of all general aviation aircraft manufactured last year was over a half billion dollars. These manufacturers employ more than 30,000 people. These jobs are part of the quarter million jobs among maintenance and support services and among engine and equipment manufacturers."

Cliff Robertson Stars As Flight Instructor

Cliff Robertson stars as flight instructor in a 20-minute, 16mm. color film available free from the Federal Aviation Administration. General aviation students, pilots and instructors will find this film interesting and helpful. In a series of flashbacks, Robertson's student pilots relive dramatic incidents which occurred as a result of "human errors."

"Path to Safety" is available for two-week loan from any FAA area office or the FAA Film Library, AC-921, P. O. Box 25082, Oklahoma City, Okla. 73125. When ordering, specify film number FA-612.

Cliff Robertson

Handicapped Employee Cited

James A. Krueger, an aerospace engineer in the agency's Western Region, recently received the first annual "FAA Handicapped Employee of the Year Award." The special plaque was presented to Krueger by FAA Administrator William F. McKee during the annual meeting of the President's Committee on Employment of the Handicapped, in Washington, D. C.

Krueger, an acute arthritic, is a general aviation enthusiast. The son of one of aviation's earliest "barnstorming" pilots, he currently is rebuilding a 1934 Waco Model UKC aircraft. By incorporating special controls and mirrors, Krueger hopes that the unique features will enable him to obtain a private pilot certificate with certain medical waivers.

Pioneered last fall, the FAA program to recognize and honor the special achievements of its handicapped employees is believed to be the first of its kind in the Federal government.

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The article on Morse code in the December 1966 *Aviation News* was of great interest to me. Espêcially the last two lines in code, which I found very easy to decipher and a very good way to learn code.

Would it be possible to print some good flying hints in code, once in a while?

Bill Fay
Clearwater, Fla.

We like your suggestion and will consider a standing "box" on the Forum *page.* In the meantime, try your skill on this one:

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• You're In Trouble

I recently obtained a hand-me-down copy of the March 1967 *Aviation News* and while I found the article "Is Your Altimeter a Liar?" very informative and interesting, the accompanying quiz left me amused and confused.

The only answer that appears to be correct is number six. If I'm wrong I'm really in trouble.

Fair Lawn, N. J.

A line-by-line check of our answers with altimeter specialists in the FAA confirms what you suspect—you really are in trouble.

• Heads in the Clouds

We are both freshmen in high school but we already know what we want to do after we graduate—we want to be airline stewardesses.

Could you please send us your brochure on requirements for airline stewardess positions.

Jefferson City, Mo.

The FAA does not publish a brochure describing stewardess requirements but all is not lost, girls. Ask your school librarian for a list of addresses of the major airlines and write directly to them for information on their training program. We're sure they'll be glad to hear from you as they are always on the lookout for bright young ladies. And, happy landing!

• Correcting an Address

The *Aviation News* for March 1967 carried a very interesting item about the newly formed National Association of Flight Instructors. However, one slight flaw marred the brief rundown on the outfit—using the address you gave I tried to contact them and had my correspondence returned for a better address. Can you oblige?

Dover AFB, Del.

Thank you for pointing out the error. The correct address is: National Association of Flight Instructors, Box N, Washington, D. C. 20014.

• Art Lover

The photograph on the cover of the December 1966 *Aviation News* was a knockout. It suited the season perfectly and yet carried an aviation theme. Can you tell me where it was shot?

Sacramento, Calif.

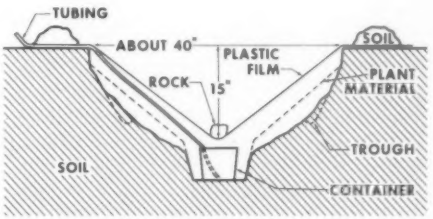
The picture was made at Lake Hood, Alaska, just outside of Anchorage.

• Encore, Encore

What edition of *Aviation News* contained the article on the solar still? We would like to include this information in our survival course.

James A. Lucey
Flight Test Research, Inc.
Long Beach, Calif. 90807

The article was titled "Water, Water, Everywhere" and it appeared in the May 1966 issue. We are sending you a photocopy of the article.



• How High I Am

In the April *Aviation News* you stated in an article on air traffic control modernization that actual altitude of an aircraft will be shown when the aircraft have altitude reporting transponders. Is this true?

Doesn't the transponder report the altimeter reading? Isn't the instrument still subject to error? And even more serious, the instrument is only as accurate as the pilot setting of the barometric pressure. This is reported verbally by radio from one human being to another.

Please set me straight.

N. Caldwell, N. J.

The altitude of an aircraft will be displayed when it employs an altitude reporting transponder. The altitude reported by the air traffic control radar beacon system (ATC/RBS) is actually pressure altitude. The basic instrument in the aircraft is still subject to normal errors and tolerances but the pilot setting of the barometric pressure does not affect the transmitted information, as this is obtained from the pressure cell at a point before the pilot's correction mechanism. The pressure altitude received from the aircraft is converted, in miliseconds, to the "altitude" read-out on the pilot's altimeter by the ground ATC/RBS equipment.

This eliminates the continual verbal transmissions which you rightly feel add a potential for error; it also reduces the torrent of transmissions which clog the frequencies.

• When In Doubt, Ask

I understand it is not necessary for a pilot to call the tower as he enters the control zone if there is an uncontrolled airport within the control zone. I fly a helicopter. My question: If I want to land at a friend's farm which is within the control zone, is it necessary to call the control tower.

Fleetwood, Pa.

Communication with a control tower is required only within an airport traffic area and only for operations conducted, to from or on an airport having a control tower.

Since the location of your friend's farm with respect to an airport is not known, and since space limitations do not permit a detailed discussion of your question or amplification of the pertinent flight rules (FARs 91.85, 91.87 and 91.89), we strongly recommend you discuss your question with the tower chief at the primary airport in the control zone.

FAA Aviation News welcomes comments from the aviation community. We will reserve this page for an exchange of views. No anonymous letters will be used, but names will be withheld on request.

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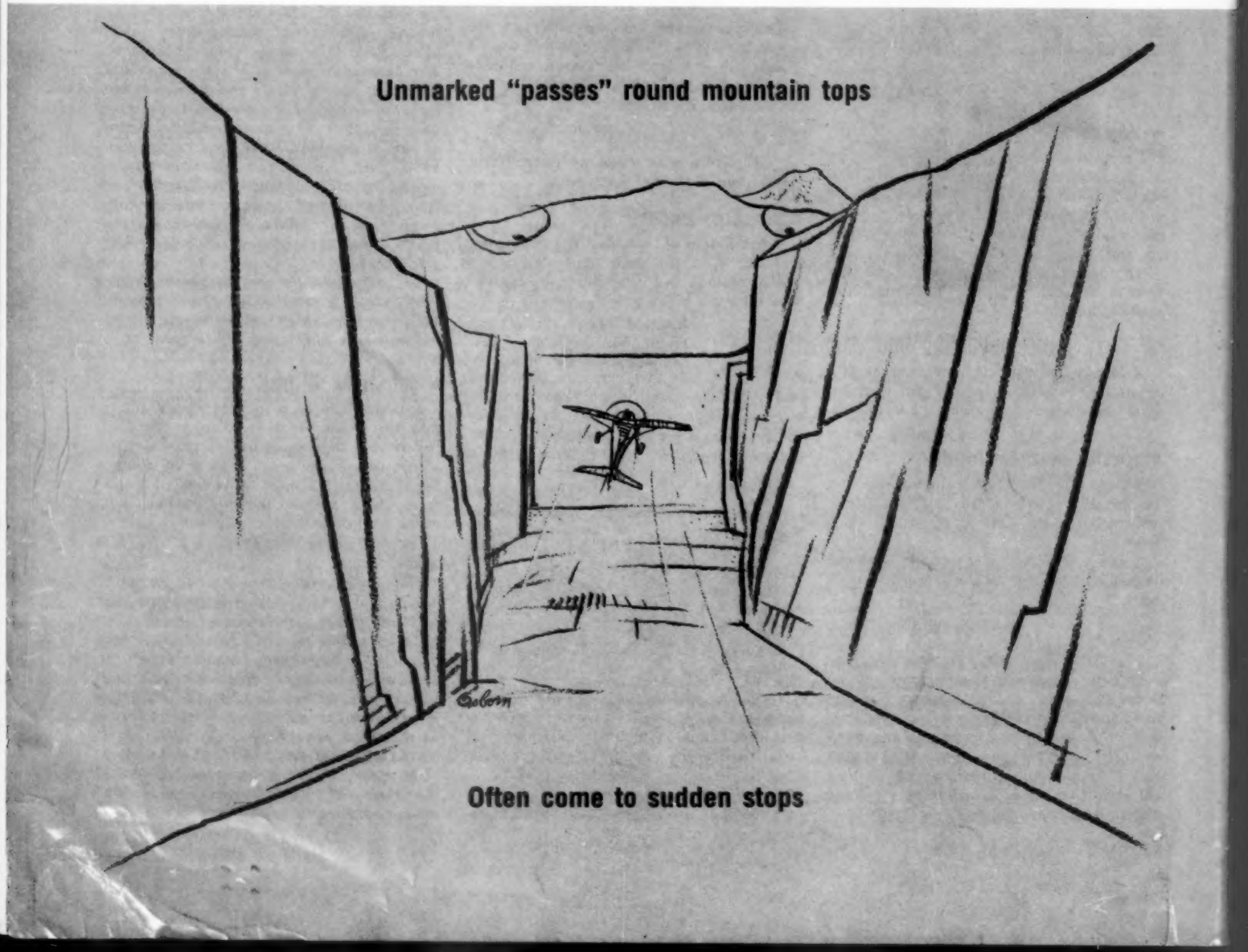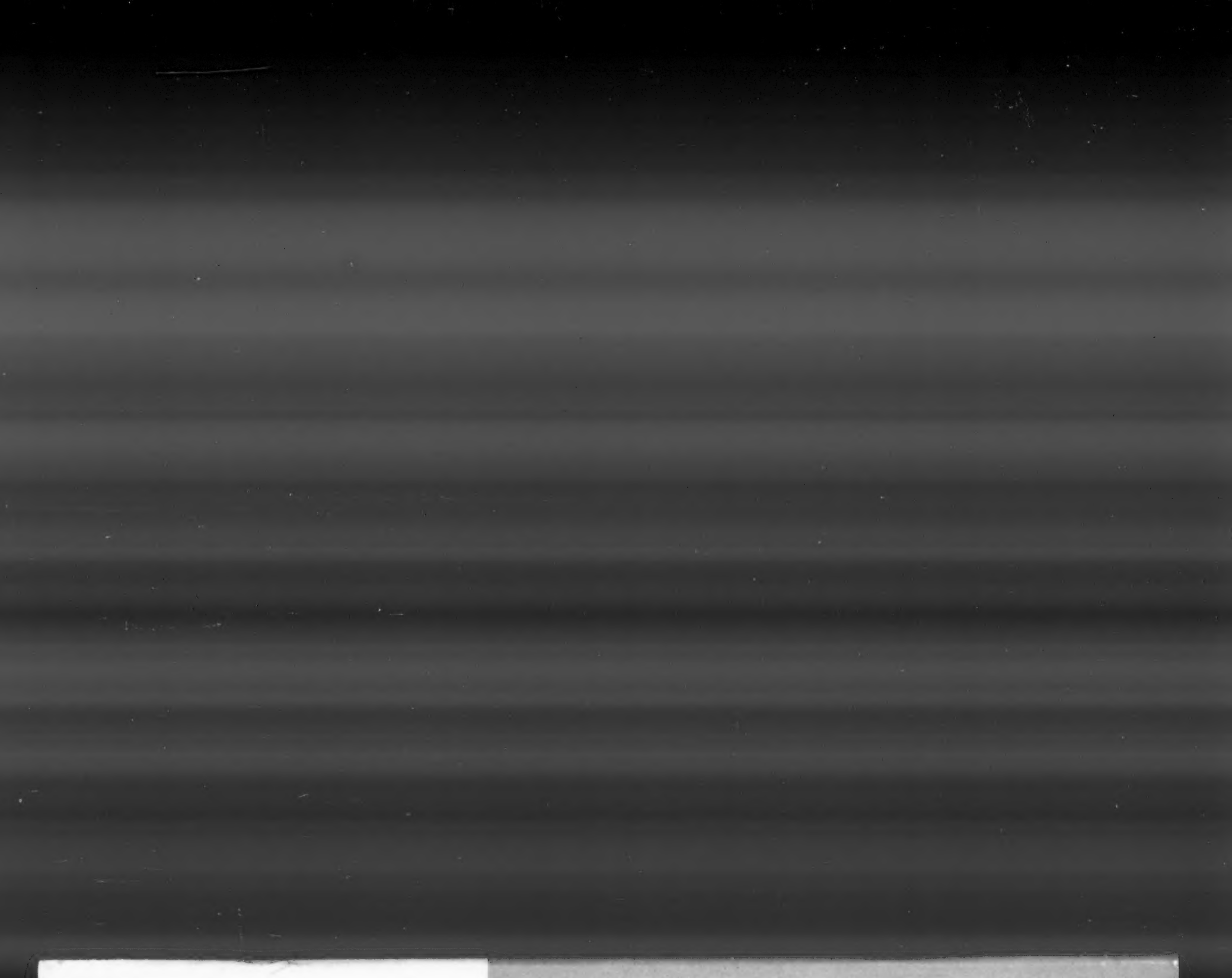
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